Appendix H

Shell Martinez Refinery Groundwater Monitoring Data for Well 228

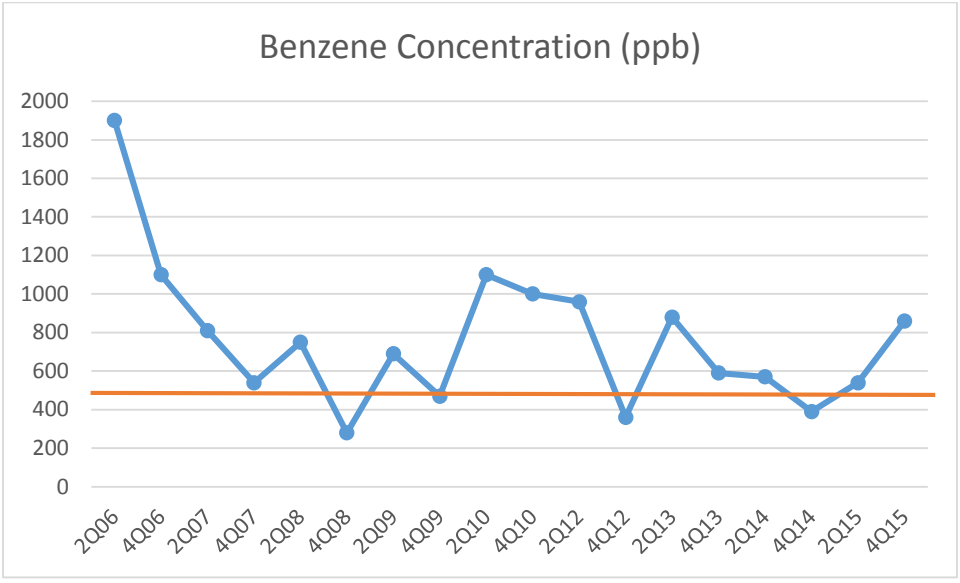
2006 - 2015

Background:

ETP-1 in-ground biotreater (Pond 7) was a RCRA permitted unit primarily due to the hazardous waste level of benzene level (>500ppb) in the wastewater received by the unit. The ETP-1 is an unlined surface impoundment with a maximum storage capacity of 3.8M gallons with an average depth of 9 feet. ETP-1 functions as an activated sludge unit (biotreater) and is equipped with aerators which provide oxygen to aid in the biological removal of pollutants. The facility ceased the discharge of wastewater that is >500 ppb benzene into ETP-1 in 1998. The ETP-1 biotreater has been receiving non-hazardous waste process wastewater and stormwater runoff from the facility since 1998 (The ETP-1 feed stream is analyzed as a composite sample from four grab samples semiannually). The constituents of concern in the ETP-1 were identified as metals, benzene, and TPHs in the SMR's RCRA permit issued by DTSC. As the ETP-1 is a critical step in the wastewater treatment process, the facility requested delayed closure because the closure of the unit would be incompatible with continued operation of the facility. DTSC approved the facility's application/permit modification for a delayed closure of this unit in 2003. For the purpose of ensuring ETP-1 biotreater is not releasing hazardous waste, the facility is monitoring eight well locations under the Regional Water Quality Control Board Waste Discharge Order groundwater monitoring program. The eight (8) monitoring wells are monitored semiannually. The groundwater is analyzed for metals, TPH, BTEX and semivolatiles/phenols. (See Table 1 Listing of Monitoring Wells and Analysis in Regional Board Site Cleanup Order R2-2014-0025)

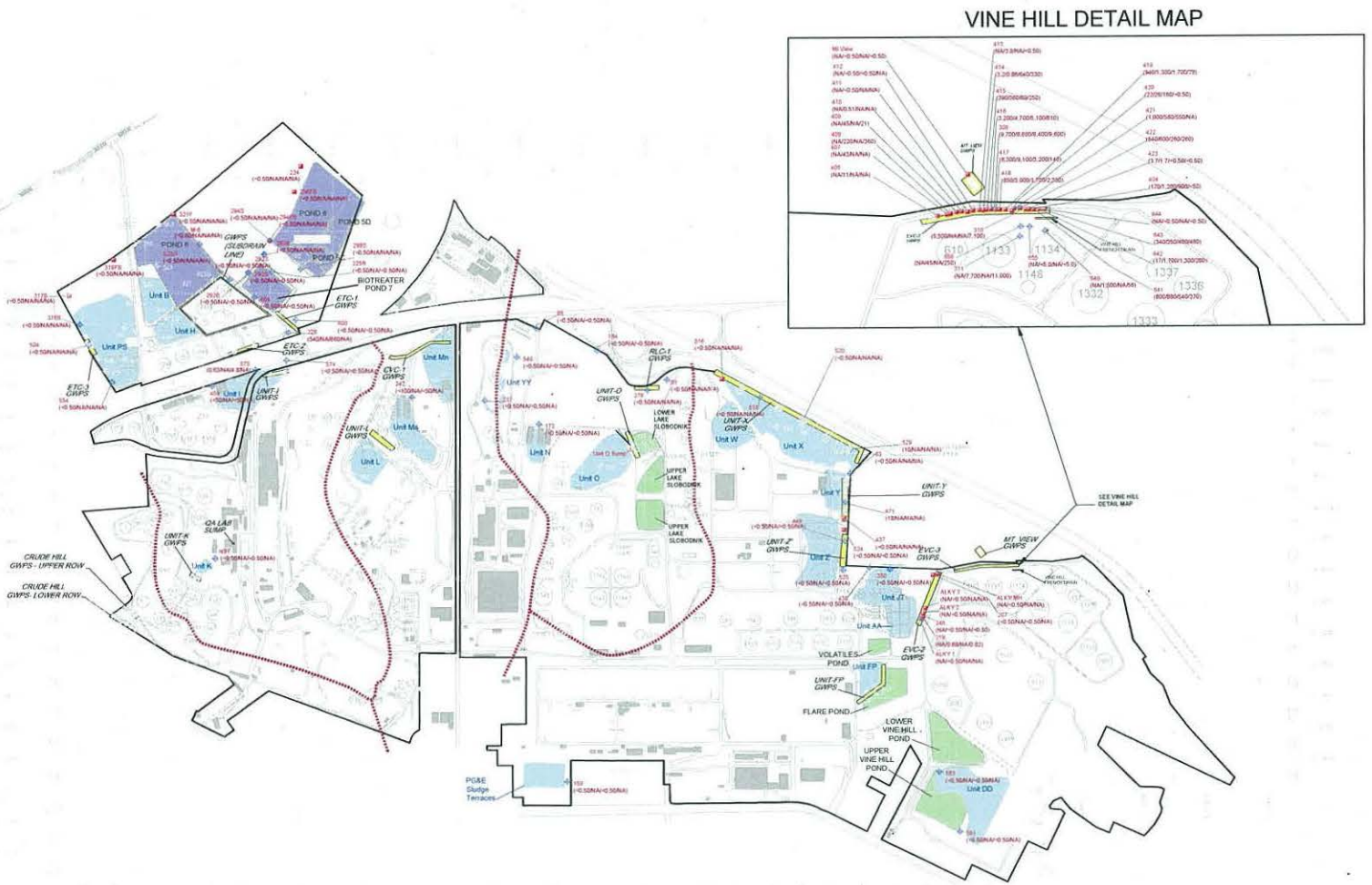
- The 8 wells are Well (225R, 228, 292B, 292S, 293B, 293S, 600, 604)
- One well (well 228) showing benzene concentrations exceeding the hazardous waste level of 500 ppb for benzene. Well 228 is also showing high levels of TPH.

Benzene data in Monitoring Well 228



Date	Benzene Concentration (ppb)
2Q06	1900
4Q06	1100
2Q07	810
4Q07	540
2Q08	750
4Q08	280
2Q09	690
4Q09	470
2Q10	1100
4Q10	1000
2Q12	960
4Q12	360
2Q13	880
4Q13	590
2Q14	570
4Q14	390
2Q15	540
4Q15	860

BENZENE IN GROUNDWATER
CHEMICAL CONCENTRATION DATA MAP 2015



LEGEND

- GROUNDWATER MONITORING WELL
- EXTRACTION WELL
- SUMP
- 543 WELL ID
- (<0.50/<0.50/<0.50/<0.50) 1ST/2ND/3RD/4TH QUARTER 2015 BENZENE CONCENTRATIONS IN GROUNDWATER, IN MICROGRAMS PER LITER (ug/L)
- NA NOT ANALYZED
- <X NOT DETECTED AT REPORTING LIMIT X
- GROUNDWATER PROTECTION SYSTEMS (GWPS)
- STORMWATER SURFACE IMPOUNDMENT
- WASTE MANAGEMENT UNIT
- WASTE WATER TREATMENT PONDS
- GROUNDWATER BASIN BOUNDARY
- SITE OUTLINE
- SITE ROADS
- SITE TANKS
- SITE FACILITIES

SHELL MARTINEZ REFINERY

BENZENE IN GROUNDWATER
CHEMICAL CONCENTRATION DATA MAP

GHD

Source Reference: BASE MAP FROM SHELL LOCATION INDEX MAP REV. DATE 1/17/14. PACIFIC ENVIRONMENTAL GROUP, INC. INACTIVE WASTE UNIT O - INTERCEPTOR TRENCH SITE PLAN, NO DATE

Project Manager	Date	FIGURE 5
J. NEELY	MAR 22/2016	
Scale: 0 200 500ft	Project No: 060197-2016	Report No: 018 / Drawing No: 005

060197-2016(018)GN-EM005 MAR 22, 2016

TABLE 1
LIST OF MONITORING WELLS AND ANALYSES
SHELL MARTINEZ REFINERY

Well	POC Well	Groundwater Basin	WMU	Sampling Frequency	Purpose	Analytical Suite
86	Yes	Reservoir Lakes	na	Semiannual (1Q & 3Q)	WMU Monitoring	A
159	No	East Valley	PG&E	Semiannual (1Q & 3Q)	WMU Monitoring	A
164	Yes	Reservoir Lakes	na	Semiannual (1Q & 3Q)	WMU Monitoring	A
173	No	Reservoir Lakes	N	Semiannual (1Q & 3Q)	WMU Monitoring	A
207	Yes	East Valley	JT	Semiannual (1Q & 3Q)	WMU Monitoring	A
237	No	Reservoir Lakes	YY	Semiannual (1Q & 3Q)	WMU Monitoring	A
242	No	Central Valley	Ms	Semiannual (1Q & 3Q)	WMU Monitoring	A
350	Yes	East Valley	JT	Semiannual (1Q & 3Q)	WMU Monitoring	A
438	Yes	East Valley	JT	Semiannual (1Q & 3Q)	WMU Monitoring	A
449	Yes	East Valley	Z'	Semiannual (1Q & 3Q)	WMU Monitoring	A
459	No	West Valley	I	Semiannual (1Q & 3Q)	WMU Monitoring	A
481	No	West Valley	K	Semiannual (1Q & 3Q)	WMU Monitoring	A
524	Yes	East Valley	Z'	Semiannual (1Q & 3Q)	WMU Monitoring	A
525	Yes	East Valley	Z'	Semiannual (1Q & 3Q)	WMU Monitoring	A
540	No	Reservoir Lakes	YY	Semiannual (1Q & 3Q)	WMU Monitoring	A
574	No	West Valley	I	Semiannual (1Q & 3Q)	WMU Monitoring	A
575	No	West Valley	I	Semiannual (1Q & 3Q)	WMU Monitoring	A
581	No	East Valley	DD	Semiannual (1Q & 3Q)	WMU Monitoring	A
583	No	East Valley	DD	Semiannual (1Q & 3Q)	WMU Monitoring	A
63	Yes	East Valley	Y	Annual (1Q)	System Performance	A & B
81	Yes	Reservoir Lakes	na	Annual (1Q)	System Performance	A
224	Yes	West Valley	Pond 5C/5D/8	Annual (1Q)	System Performance	A
279	No	Reservoir Lakes	na	Annual (1Q)	System Performance	A
437	Yes	East Valley	Y	Annual (1Q)	System Performance	A & B
471	Yes	East Valley	Y	Annual (1Q)	System Performance	A & B
504	Yes	West Valley	PS	Annual (1Q)	System Performance	A & B
516	Yes	East Valley	X	Annual (1Q)	System Performance	A & B
518	Yes	East Valley	X	Annual (1Q)	System Performance	A & B
520	Yes	East Valley	X	Annual (1Q)	System Performance	A & B
529	Yes	East Valley	X	Annual (1Q)	System Performance	A & B
554	Yes	West Valley	PS	Annual (1Q)	System Performance	A & B
293S	Yes	West Valley	Pond 5C/5D/8	Annual (1Q)	System Performance	A
294FB	Yes	West Valley	Pond 5C/5D/8	Annual (1Q)	System Performance	A
294S	Yes	West Valley	Pond 5C/5D/8	Annual (1Q)	System Performance	A
296FB	Yes	West Valley	Pond 5C/5D/8	Annual (1Q)	System Performance	A
316B	Yes	West Valley	PS	Annual (1Q)	System Performance	A & B
317B	Yes	West Valley	PS	Annual (1Q)	System Performance	A & B
319FB	Yes	West Valley	na	Annual (1Q)	System Performance	A
321F	Yes	West Valley	Pond 4	Annual (1Q)	System Performance	A
323G	Yes	West Valley	Pond 6	Annual (1Q)	System Performance	A
M-6	Yes	West Valley	Pond 5	Annual (1Q)	System Performance	A
228	No	West Valley	Pond 7	Semiannual (1Q & 3Q)	RCRA Monitoring	C
600	No	West Valley	Pond 7	Semiannual (1Q & 3Q)	RCRA Monitoring	C
604	No	West Valley	Pond 7	Semiannual (1Q & 3Q)	RCRA Monitoring	C
225R	No	West Valley	Pond 7	Semiannual (1Q & 3Q)	RCRA Monitoring	C
292B	Yes	West Valley	Pond 7	Semiannual (1Q & 3Q)	RCRA Monitoring	C
292S	Yes	West Valley	Pond 7	Semiannual (1Q & 3Q)	RCRA Monitoring	C
293B	Yes	West Valley	Pond 7	Semiannual (1Q & 3Q)	RCRA Monitoring	C
293S	Yes	West Valley	Pond 7	Semiannual (1Q & 3Q)	RCRA Monitoring	C

Analytical Suite	Constituents
A	Ba, Cr, Pb, Ni, Zn, BTEX/TPH-G & Purgeables
B	Phenols
C	Ba, Cr, Cu, Pb, Hg, Ni, Se, V, BTEX/TPH-G & Purgeables, Semivolatiles/Phenols

Notes:
WMU = Waste management unit
na = not applicable
POC = Point of Compliance